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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,002	11/06/2001	Glen E. Roeters	DENSE-049A	9043

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EXAMINER
MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 04/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/994,002	ROETERS ET AL.	
	Examiner	Art Unit	
	James Mitchell	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This office action is in response to the application filed November 6, 2001.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claim 5, it is indefinite as to how the word transposer limits the scope of a pad. In regards to claim 8, it is indefinite as to how feed limits the scope of a through hole.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-9, 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shokrgozar (U.S 5,434,745) in view of Wen-Chen (U.S 6,269,003).

7. Shokrgozar (at Fig. 1,3 and 4) discloses an IC chip stack (Fig. 3) comprising at least two carriers (Fig.1, Item 1) with a first conductive pattern (2) attached to rectangular thermal rings (19 and 27) which possesses inherent longitudinal and lateral side sections with opposite top and bottom surfaces that define a thickness (Column 4, Line 63), with a second conductive pattern formed thereon electrically connected to the first conductive patterns (Abstract, Lines 9-10) via a feed through hole ("through hole") and at least two IC chips (Fig.3, not given a reference no.) connected to the first patterns (via wirebond) with at least one chip circumvented by the ring and disposed between the carriers having a rectangular configuration and a transposer (30) having a rectangular configuration with a top and bottom portion and a third conductive pattern (29), each said carrier defines an opposite top and bottom surface with the first pattern comprising a first set of carrier pads (square portion of pattern closest to chip shown in Fig.1) a second set of pads (square portion of pattern farthest from chip, Fig.1) electrically connected to the first set (via slender portion of pattern), and a third set of carrier pads (shown as square portion of pattern) formed on the bottom of said carrier (Fig. 2A, B), said chip disposed on the top surface and electrically connected to some of the carrier pads (shown in Fig. 1) with the second and third set connected to the second conductive pattern on a ring (Abstract), the third conductive pattern comprises a first set

portion connected to the bottom carrier's third pad which is connected to the second and first pattern via through holes (Abstract) along the same identical pattern (Column 3, Lines 24-25), connected to a second set of transposer pads (square pattern portion farthest from carrier), the transposer and carriers defining opposed pairs of longitudinal and lateral peripheral edge segments wherein the transposer pads (as understood to mean a pad on a transposer) of the first set extend along a longitudinal and lateral peripheral of the layer, said chip comprises a package (via the attachment of wirebonds to the chip), the ring pads extend along the longitudinal and lateral side section via the pad on the top and bottom surfaces connected by the metallized feed-through hole (Abstract), wherein each chip comprises a package (Column 1, Lines 19-20; Column 3, Lines 15-16) and is sized with the ring such that the body does not protrude beyond the top surface of said ring (Column 4, Lines 63-66) .

8. Shokrgozar does not show at least two flow channels, which form castellations within the ring, however Wen-Chen utilizes airflow channels or castellations within lateral walls (Fig. 4).

9. It would have been obvious to one of ordinary skill in the art to incorporate flow channels within Skokrgozar's lateral portion of the ring in order to provide heat ventilation as taught by Wen-Chen (Abstract).

10. In regards to claim 12, Shokrgozar does not explicitly disclose that the package is a BGA, however it suggests that the package may be a conventional surface mount (Column 1 Lines 19-25; Column 3, Lines 10-11).

11. The examiner takes official notice that it would have been obvious to one of ordinary skill in the art to form the package of Shokrgozar as a BGA, since a BGA is a type of conventional surface mount well known at the time the invention was made for increased density.

12. In regards to claim 19 the limitation that the channels were a rectangular configuration would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, that produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

13. Claims 13-15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shokrgozar and Wen-Chen in view of Kato (U.S 5,051,865).

14. Skokrgozar and Wen-Chen disclose the elements stated in paragraphs 7-9, but do not show a heat sink. However, Kato (Fig. 14) utilizes a copper heat sink (3) interposed between a chip (1) stack by an adhesive (33).

15. It would have been obvious to one of ordinary skill in the art to modify the combined structure of Skokrogozar and Wen-Chen with a heat sink interposed between the chip stack in order to improve heat dissipation as taught by Kato (Column 1, Lines 43-44).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. IBM Technical Disclosure (Vol.33, Issue 1B, Page 276), Suzuki, et al (U.S 5,726,492), Lauffer et al. (U.S 4,953,060), Sakuma (JP 406132413).

The prior art discloses in IBM Technical Disclosure, Suzuki and Lauffer the use of a heat sink interposed within a chip stack, and in Sakuma the use of a channel within a ring.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmm
March 23, 2002

DAVID E. GRAYBILL
PRIMARY EXAMINER